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ABSTRACT

This study examined teacher characteristics influencing the frequency of computer use in preschool classrooms and explored the effectiveness of a 3-hour computer workshop emphasizing social collaboration at the computer on enhancing teacher perceptions. Participating in the study were 38 Head Start teachers and day care providers in rural Western Pennsylvania attending two computer workshops at a local college with a preschool laboratory school. Workshop topics included classroom logistics and developmentally appropriate programs, preschools' experiences in computer use, and hands-on experiences in which teachers worked with partners to learn several preschool computer programs. Data on teacher characteristics were collected through a questionnaire. Pre-post questionnaires were used to obtain information on computer self-efficacy, computer values, and computer anxiety. Findings indicated that quality and quantity of prior experience influenced self-efficacy and anxiety. Frequency of computer classroom use was related to computer anxiety and number of types of computer training. Teachers were most concerned about task demands and damaging the equipment, rather than socially anxious. The computer workshop focusing on social collaboration was effective in reducing computer anxiety and enhancing self-efficacy and values. Findings pose implications for teacher training. (KB)

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Running Head: COMPUTER TRAINING FOR PRESCHOOL TEACHERS

Computer Training for Preschool Teachers: Impact on Computer Self-Efficacy, Values, and Anxiety

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Presented at Head Start's Sixth National Research Conference, June 26-28, 2002, Washington, D.C.

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Abstract

The impact of quality and quantity of prior experience on computer self-efficacy, values, and anxiety was examined in a sample of 38 Head Start teachers and day care providers. Both factors influenced self-efficacy and anxiety; however, frequency of classroom use was related to computer anxiety and number of types of training. Teachers were most concerned about task demands and damaging the equipment, rather than social anxiety. A computer workshop focusing on social collaboration was effective in reducing computer anxiety and enhancing self-efficacy and values. Implications for teacher training are discussed.

Computer Training for Head Start Teachers: Impact on Computer Self-Efficacy, Values, and Anxiety

What factors impede preschool teachers' use of computers in the classroom? Donohue, Borgh, and Dickson (1987) identified several barriers to effective computer use in preschools, including uninvolved staff, unclear curricular goals, lack of training, and logistical issues. Landerholm (1995) found that the majority of preschools in her study were still in the early stages of organizing their computer curriculum and providing training to teachers.

Our study examined teacher characteristics that influence the frequency of computer use in preschool classrooms. Research on elementary school teachers has focused on several measures, including prior experience and perceived past success (Goss, 1996; Kellenberger, 1996), computer values (Kellenberger, 1996), anxiety (Bradley & Russell, 1997), and self-efficacy (Kellenberger, 1996). We also explored the effectiveness of a 3-hour computer workshop emphasizing social collaboration at the computer on enhancing teacher perceptions.

Method

Participants

Thirty-eight Head Start teachers and day care providers from eight programs in rural Western Pennsylvania participated in two computer workshops at a local college with a preschool lab. Subjects were recruited through advertisements, mailings, and "word-of-mouth". All but one participant was female, with an average age of 35.51 years (SD = 9.19).

Materials

Questionnaires. For Part I, a demographic and computer usage questionnaire asked: gender, age, occupation, computer use, computer access (classroom, school office, home), number of years using computers, frequency of computer use in the classroom, number of hours of computer training, type of training(s), and number of types of trainings. As a measure of prior success, participants rated the statement "I have been successful in the past when working on computers" (Kellenberger, 1996).

Part II of the questionnaire consisted of three scales. A computer self-efficacy scale consisted of six items based on Landerholm (1995). Sample questions include items such as "I feel effective working on the computer". Items were rated on a 5-point scale, with three reversed items (pretest alpha = .752, posttest = .723).

A computer values scale examined the importance participants placed on computers, and was modified from Landerholm (1995) and Kellenberger (1996). One item was dropped, and seven items comprised the final scale, three items were reversed, and all items were rated on a 5-point scale (pretest alpha = .847, posttest = .862). Examples of items include "Computers are important to teaching".

Computer anxiety was rated based on a 12-item scale modified from Bradley and Russell (1997) for elementary school teachers. Scale items were rated on a scale of 1-5 (1 = doesn't concern me at all, 5 = great concern) and participants rated statements such as "getting stuck and not knowing what to do". Higher scores indicated higher anxiety (pretest alpha = .866, posttest = .92).

Computer knowledge was also evaluated. However, due to poor reliability (< .60), this scale was dropped from the analyses.

Computer workshop. The 3-hour workshop focused on using computers to facilitate children's social skills. Topics included: (1) Classroom logistics and developmentally appropriate programs, (2) two preschools' (one Head Start classroom) experiences, with case studies, social facilitation protocols, and video clips, (3) a 45 minute "hands-on" computer session in which teachers working with partners learned several preschool computer programs.

Procedure

Initially, all participants filled out both Parts I and II. At the end of the workshop, only Part II was completed. The questionnaires for Part II were given in the following order: computer self-efficacy, computer values, and computer anxiety.

Results

Demographics of computer use

All participants had computer access, and 86.8% felt they needed more training in using computers. Specifically, 97.4% had used a computer before, 94.7% had a computer in the classroom, 59.5% had access to a computer in the office, and 61.8% had a home computer. When asked how long they had been using computers, 21.6% said <1 year, 24.3% 1-2 years, 13.5% 3 years, 2.7% 4 years, 8.1% 5 years, and 29.7% indicated more than five years. Respondents had on average two types of training, $\underline{M} = 2.29$, $\underline{SD} = 1.249$.

When examining interrelationships between variables reflecting prior experience, years of computer use, number of hours of training, and number of types of training were all significantly positively correlated (see Table 1). In turn, the more training individuals had the more likely they were to rate their prior success with computers as high, demonstrating its

validity as a summary variable of prior experience. Frequency of computer use in the classroom, however, was positively related only to number of types of training, perhaps reflecting higher levels of motivation or different modes of learning. Age was not related to any variables.

Table 1
Relationship between Prior Experience and Frequency of Use

	1 # Years	2 # Hours Training	3 # Types Training	4 Age	5 Prior Success	6 Frequency Use+
1	-----	.506**	.612**	-.232	.404*	.297
2		-----	.611***	-.069	.322*	.095
3			-----	-.288	.383*	.348*
4				-----	-.002	.094
5					-----	.055
6						----

* p < .05. **p < .01. ***p < .001.
+ Teachers who had computers in the classroom (N=36)

We next examined teacher attitudes towards computers. Results indicated that self-efficacy was positively correlated to computer values, and negatively correlated with computer anxiety (see Table 2). Computer anxiety, in turn, was related only to computer self-efficacy, with a negative correlation. Measures were modestly correlated, indicating similar but non-overlapping characteristics. Within measures, pre and post values were correlated with one another. The correlations were modest for self-efficacy and anxiety, perhaps indicating the influence of the workshop.

Table 2
Intercorrelations between Teacher Characteristics

	1 Self-efficacy Pre	2 Self-efficacy Post	3 Values Pre	4 Values Post	5 Anxiety Pre	6 Anxiety Post
1	------	.560***	.352*	.403*	-.455**	-.463**
2		------	.548**	.709**	-.201	-.438**
3			------	.830**	-.121	-.109
4				------	-.04	-.161
5					------	.585**
6						------

*p < .05. **p < .01. ***p < .001.

We then explored the relationship between prior experience, attitudinal values, and frequency of use. Teachers with more years and types of computer training, and higher prior success scores had higher computer self-efficacy pre and post, and lower pretest computer anxiety (see Table 3). Computer anxiety, however, was the only attitudinal variable that influenced use in the classroom. Specifically, teachers with lower pretest computer anxiety used computers more frequently. Pretest relationships for computer anxiety were no longer found during the post-test, possibly due to the impact of the computer workshop.

To further examine the impact of the workshop, paired t-tests were used to compare changes in pre versus post measures. Over time, participants showed higher levels of computer self-efficacy, $t(37) = 3.544$, $p < .001$, and computer values $t(37) = 2.303$, $p < .027$, and lower levels of computer anxiety, $t(37) = 2.954$, $p < .005$.

Table 3
Descriptive Statistics and Relationships Between Teacher Characteristics and Prior Experience

	1 Self-efficacy Pre	2 Self-efficacy Post	3 Values Pre	4 Values Post	5 Anxiety Pre	6 Anxiety Post
Mean/sd	3.38/0.71	3.76/0.68	4.05/0.79	4.22/0.74	2.37/0.80	2.01/0.84
# years	.452**	.331*	.139	.215	-.390*	-.288
# hours training	.146	.341*	.158	.236	-.128	-.231
# types training	.379*	.389*	.269	.273	-.405*	-.143
Prior success	.651***	.336*	.131	.263	-.396*	-.294
Freq+ Use	.154	.085	.150	.046	-.343*	-.091

* $p < .05$. ** $p < .01$. *** $p < .001$.
+ Teachers who had computers in the classroom (N=36).

Finally, we examined the sources of teacher's computer anxiety by conducting a paired t-test analysis for each item on the questionnaire. Teachers were most anxious about task demands (getting stuck, not understanding the computer), damaging the computer (i.e. breaking the computer and erasing and messing up important information), and feeling out of control. These concerns diminished after participation in the computer workshop. They were least anxious about social concerns (i.e. looking stupid, negative view of colleagues or students).

Table 4: Pre and Posttest sources of anxiety

Sources of Anxiety	Pretest		Posttest	
	Mean	SD	Mean	SD
Getting stuck***	3.39	1.17	2.50	1.25
Not understanding the computer***	3.24	1.05	2.66	1.21
Thinking you are slow and inefficient	1.97	1.15	1.82	1.11
Too preoccupied with computer to perform duties	1.87	1.28	1.66	.88
Breaking the computer+	2.47	1.43	2.05	1.39
Erasing important information+	2.95	1.45	2.50	1.22
Messing up important information	2.97	1.42	2.55	1.33
Students watching you and knowing more	1.82	1.31	1.50	1.03
Colleagues evaluating skills negatively	1.87	1.21	1.79	1.07
Looking silly or stupid	1.55	.92	1.55	.83
Feeling out of control*	2.05	1.25	1.58	.92
Feeling overwhelmed and hopeless	2.34	1.40	2.03	1.24

Note. A Paired Samples T-test was used to compare pre and post test scores.
* $p < .05$. ** $p < .01$. *** $p < .001$. + $p < .1$.

Discussion

Preschool teachers use computers in their classrooms, but the frequency of computer use was related to computer anxiety and number of types of training. The findings on computer anxiety support the research of other investigators working with elementary school teachers

(Bradley & Russell, 1997). Therefore, workshops for early childhood providers should concentrate on reducing computer anxiety and providing a variety of training opportunities. For example, work by Slutsky, Kantor, and Fernie (2002) shows that providing computer training within a social support network, and encouraging teacher empowerment over a period of time greatly enhances their comfort level with computers.

In addition, our findings indicate that both perceived quality and quantity of past computer experiences influence teacher computer self-efficacy and pretest anxiety, as has been shown in previous studies (Bradley & Russell, 1997). The findings on computer values indicate that while teachers may view computers as important, they may still be anxious about using them. The lack of an impact of age corresponds to other studies (Honeyman & White, 1987), indicating that older teachers are not more technophobic.

Participants in our workshop showed increased computer self-efficacy and values, and decreased anxiety, particularly for task demands. We attribute workshop effectiveness to our "hands-on" component, video clips, and social skills focus, an area where teachers already have a knowledge base. Future research should include a control group to fully evaluate this approach.

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